LArSoft minutes, 23-Feb-2011. -- Eric Church

LArSoft minutes appear at https://cdcvs.fnal.gov/redmine/projects/activity/larsoftsvn. (The location presumably at which you found these!) For further details of matters reported here drill down into the wiki, etc, at that redmine site. Everyone is welcome to attend the bi-weekly meetings. Next meeting will be 2/23/2011. It will be in 7th floor x-over Racetrack. This is our new home, every other Wednesday, excluding the brief foray to the Snakepit of last wk.

There are pdfs on the documents link of the redmine site for today's presentations by Mitch, Eric, Adam, Saima. Click Documents, sort by Date.

Mitch showed funky (Mandelbrot) images resulting from a glitch in a gdml script that lays out the wires for the ArgoNeuT geometry. This turns out to be important for Adam. See below. Wires were skipped and/or doubled in the corners where they attach to theTPC. Mitch added methods to Geometry which extract the y,z coordinates of wires from separate planes which intersect. He then went onto discuss ambiguities in determining track trajectories, vis-a-vis the projections to N hits in one plane and M in another. The problem is worst for track directly parallel to the TPC axis. The worst case gives N_w! possible trajectories, where N_w is the number of wires in each plane. A 3rd plane (or a tilt of one of the 2 planes wrt the other) or some info from the signal shape helps break the degeneracies. Mitch notes that we don't currently associate all cluster hits from both views (ArgoNeuT just has 2 planes), but that we only associate hits along pre-fit lines. He argues we should allow to produce any curved trajectory, using all hits. Eric, Brian, Mitch discussed the ways in which a Kalman track fitter may bolt onto the output of a 3D spacePoint determining algorithm or how it might instead be integrated. Mitch will deliver part 2 of this talk in which he shows results in the near future. Stay tuned.

Adam showed this same wire placement gdml bug in uBooNE. Fixing it made the pernicious and lingering problem of GENIE+LArG4 problem go away. Yay, for Adam. Research can now go forward. Adam also showed that there are now two LBNE geometries: LBNE and LBNEbulky. The latter has ~110m of rock in all 6 directions away from the center of the TPC, whereas the former has a more modest amount of rock.

Eric presented his work in trying to speed up the LArG4 stage of LArSoft. He discussed TrackStacking, which for the large uninstrumented volume of rock he's working in provides great gains. This is a G4 option for taking control of what particles are tracked. Equal or larger speed gains were then obtained by increasing the voxel size of the LAr. Now, half his condor jobs run, which is a big improvement over 0. We still have the problem, we think, of large events with lots of showering activity blowing out the memory. And in particular jobs which can avail themselves of the full 4GB of memory on uboone,lboone,argoneut-gpvm01 may well still crash on condor where the limit is 2GB/core. Eric reports that the big offender is LArVoxelReadout.cxx, where attaching with gdb to the process and stopping it demonstrates a very slow walk of particles through the TPC in large, complex events. Bill Seligman, the author of this code, thinks he may have an idea for a solution. We hope to get Bill to pursue that soon. It will make a huge difference to everyone now pursuing analysis using LArG4 and the full recon chain. Eric reports he'll aid Bill with this. Eric's other future task is to understand G4's Scoring/Biasing strategies, which allow for propagating infrequent events (like his Ndk backgrounds) with good statistics with re-weighting techniques.

Saima reported on getting NUANCE (GENIE competitor, now unsupported) results into LArSoft. She and Brian produce the actual GENIE runs on Brian's laptop -- a mode of attack which may not be sustainable in the longterm -- but then swizzle the resulting text file. Saima propagates event codes and other truth info and stuffs that into the proper objects. It's a nice and useful piece of work. Saima's motivation is that she can get hyperons out of NUANCE, but not out of GENIE.

Brian reported that new recruit Tingjun will produce a cluster module, in the manner we've discussed in this space before. Herb Greenlee is signed up, but hasn't yet committed to a package/module/piece of work. We know there are lots of other competent new LArSofters out there just starting to familiarize themselves with the code. Brian and I have an informal list of suggestions for where someone can dive in and do interesting work and/or physics. Come see us.

See ya at the next LArSoft mtg in the Racetrack, 7th floor on 3/9, Wed, 9am CST.

Details for the next meeting:

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>>> video: 85LARSW
>>> phone: 510 883 7860 (ID 85LARSW)
>>> fnal location: Racetrack, 7th floor x-over
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